

**Response to FCC Notice Of Inquiry
FCC 04-55, GN Docket No. 04-54, March 17, 2004**

The Optoelectronics Industry Development Association (OIDA) offers the following response to the FCC regarding their Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996.

Introduction

The remarks which follow reflect, in part, industry consensus and conclusions reached at a recent OIDA roadmapping workshop held in Washington, DC, in March.

The United States telecommunications industry is on the brink of a dramatic change. This change, if handled well, can greatly benefit network users and foster economic growth. There are two main features of this change, and they are closely tied to this Inquiry:

- 1) The new true broadband network must operate at speeds dwarfing those we see today. Our competitiveness as a nation depends on it.
- 2) Voice traffic will be but a tiny fraction of network usage, and prices for voice will continue to fall rapidly.

Ownership of networks will extend beyond service providers, providing a broader base for investment. At the same time, today's telcos will find new opportunities as *facilitators* – designers, installers, and managers – of the new networks. The change will re-ignite the domestic markets for equipment makers and installers, bringing back jobs and forming a new infrastructure that will support innovation.

The focus of regulation should be on broadband service, not on voice service. Voice is increasingly taking on the character of yet another form of data, and narrowband data at that. The key issue for regulators is to devise rules that will facilitate the change to a truly high-speed *data* network as rapidly as possible, while we still remain competitive as a nation and can afford to do it.

Guided by this simple principle, regulations will ensure that no investors are locked out of a market, that the data to judge success measure true broadband *capability*, not just numbers of lines. Users are likely to have only one fiber serving their home or business, so they must have a choice of multiple content and service providers in order to ensure that prices are market-driven and low.

Issues for the Inquiry

What is “Advanced Telecommunications Capability”?

As the Commission clearly realizes in asking the question, it is essential that the definition of “advanced telecommunications capability” be revised to keep pace with changes throughout the world since the last Inquiry.

A reasonable target in today's world is general availability of 100Mbps *symmetrical* service to the end user within the next five years, and such service should be easily upgradeable to 1Gbps as demand rises.

That's for residential customers. Services for business customers should be able to rise gracefully to 10Gb/s. Symmetrical service, that is high-speed both to and from the user, will be increasingly important. Users increasingly create high-bandwidth content, especially with the rapid growth of digital imaging, for example, and cannot be constrained

Of greatest importance, regardless of the service speed actually delivered to the user initially, is that **broadband networks should be capable of 1Gb/s service** at a minimum. It is too expensive for us as a nation to keep replacing old infrastructure, so we should plan for many years of life. "Easily upgradeable" means simply changing the electronics on the ends, not replacing the cable, the most expensive aspect of network installation.

While this target may sound aggressive, it is important to realize that **other nations are moving much more quickly to implement "true" broadband**, and many of them already have rapidly growing service at these levels at a reasonable price.

The U.S. had fallen to 11th place in per capita broadband per capita penetration in 2002, according to the OECD, and is most certainly lower than that now, as this data takes a long time to collect. But even this dismal ranking does not tell the whole story. The "broadband" we have deployed is mostly through cable modems and low-speed DSL. Offerings in Japan and Korea are in the multi-megabit range already. 100Mb/s is available in Japan today, within a short time will be widely deployed and further upgraded. Plans in Japan call for 1Gb/s per user by 2005.¹

We should be number one. Only by setting our goal to be ahead of where others are now do we stand any chance at all of moving into our former leadership position in communications. Our global competitiveness is at stake.

While in some countries providers have been able to make significant improvements using their copper infrastructure, our systems are older and of longer reach on average than more densely populated Asian cities, for example. We have a short-term opportunity to change this picture – to deploy a state-of-the-art fiber network. If we expend limited capital resources on the wrong technology and the wrong network, we will only fall further behind.

Why should we do this? Some in the U.S. believe that we do not need true broadband, that there is not sufficient demand to justify the effort. They would claim that 10Mb/s or even 2Mb/s is "sufficient". A narrow focus on conventional TV or today's Internet use would support such a view. **But others are already far ahead of this standard!**

The technology allows us to advance; the economy demands that we advance. The economic and social impact will be enormous. Where people have broadband they use it, as illustrated by the examples below.

¹ Japanese Optoelectronics Industry Technology Development Association, *OITDA Activity Report*, Vol. 16, for FY ending March 31, 2003.

Jobs: TeleNomic² has estimated that 1.2 million new jobs could be created in building a new national high-speed network. As many as 72,000 of these would be associated with manufacturing the equipment used in the network.

Economic development: The Korean economic recovery has been credited to conscious government action to improve broadband availability. Information technology contributed 50% to the Korean GDP in 2002.

e-Business: More than 12% of Korean retail trade was online in 2003³, and it is growing very rapidly – up from 4.2% in 2002. The comparable figure in the US is about 1.6%⁴. Ironically, this figure has been cited as evidence that broadband is not in high demand in the US and therefore no special efforts to improve it are warranted.

Healthcare: The EVISAND network in Seville, Spain provides virtual support in health emergency situations, telemedicine specialist consultation, and training for health professionals. EVISAND' virtual healthcare has resulted in a 20% reduction in health transport costs in the region, among other benefits. The network was one of four winners of eEurope awards for eHealth in 2003.⁵

Education: Spokane, Washington's School District No. 81 pioneered gigabit Ethernet for schools. The network, in operation since 2000, connects all the classrooms in the 53 school sites in the district. Now teachers can have all students in a class online at the same time. They can visit to the Louvre, for example, or NASA's web site for a greatly enriched teaching experience.⁶ Most schools in the U.S. do not have such capability, even now, four years later than Spokane's was installed.

Entertainment: In Korea, where broadband is ubiquitous, online games companies are projecting sales of \$640 million for 2004. Now they're getting ready to export this new form of entertainment and will likely eclipse the market for console games. The *state-funded* Korea Game Development & Promotion Institute estimates the foreign revenue of Korean online-game companies will be \$143 million this year.⁷ Entertainment, we note, has long been one of the most successful exports of the U.S. How much longer will this be the case?

So, does the demand support an aggressive effort? Yes!

We believe demand will develop quickly as true broadband services become available. This is the strength of our country; we learn quickly to innovate new ways to use new technology. Amazingly, it was only a decade ago that only a few even knew about

² TeleNomic Research, LLC, "Building a Nationwide Broadband Network: Speeding Job Growth", Feb. 22, 2002

³ Assif Shameen, "Korea's Broadband REVOLUTION", *Chief Executive*, April 2004

⁴ U.S. Dept. of Commerce, February 23, 2004, "Estimated Quarterly U.S. Retail Commerce Sales"

⁵ European Institute for Public Administration, e-Europe Awards 2003 (<http://www.e-europeawards.org>)

⁶ Jean Marie Angel, "Learning in the Fast Lane", *District Administration*, Dec. 2001.

⁷ *Business Week*, April 19, 2004.

email. We need to keep in mind the propensity for Americans to change their lifestyle quickly in response to new opportunity.

Such a view involves taking some risk, because it is not possible for those who have never seen or used – perhaps not even heard of – the alternatives, to make a considered judgment of what they “need”. Rather for support, we must look at those limited comparative examples available to us, both here and abroad, to appreciate what must be done.

Is Advanced Telecommunications Capability being Deployed to All Americans?

The Commission’s efforts so far to measure and document broadband deployment are to be commended. By calling attention to the distribution of DSL and cable services, and the availability of competitive offerings, the results have undoubtedly encouraged investment and efforts by the infrastructure providers to improve services. Indeed, it is true that by these measures there was a 45% increase in the number of “high-speed” (old definition) lines in one year, from June 2002 to June 2003.

But there are significant discrepancies among groups of Americans, and large gaps in deployment. If we measure only with a coarse scale that does not distinguish among levels of service, we will not see the clear divergence of capability that is impending. We will not understand that while more and more Americans might be getting what we have called broadband, in fact only a few are getting access to the competitive technology that can make a difference in their lives.

A joint study by the U.S. Department of Agriculture and the Commerce Department found in 2000 that while broadband access was available in 65% of cities with population greater than 250,000, the number dropped to 5% for cities of population between 5000 and 10000. Among towns of less than 1000 population, under one percent had broadband of any kind.⁸ To the extent that broadband brings new economic opportunities, as some of the examples above show that it does, rural populations in America are likely to become increasingly disadvantaged.

Even with the limited broadband options available now, it is possible to do a better job estimating the supply. **The FCC should define *classes of broadband, ranging from the low-speed, 200kbps, DSL, to the best – 100Mbps or more*** with equal speeds for upload and download. By doing so it will be possible to document and thus to understand better the several technology trends, their rates of deployment and acceptance and economic impact.⁹ This change in data collection should accompany the redefinition of broadband.

⁸ National Telecommunications and Information Administration press release, April 26, 2000 (<http://www.ntia.doc.gov/ntiahome/press/ruralpr42600.htm>)

⁹ For example, if we measure broadband penetration by zip code, we miss the problems of short-reach copper lines not being able to serve customers located well away from the central office. Further parsing of the data with added detail on DSL and cable customers, regions, and pricing, may not yield too many new insights as to the future needs and demands of the nation. In fact, such focus may serve to encourage unwarranted investment in these older, soon to be obsolete, technologies – investment that would be better directed towards establishing a far more capable infrastructure.

Is Deployment Reasonable and Timely?

We noted above that there was a 45% increase in broadband subscriptions last year in the U.S. This is a fairly good rate of increase on an absolute scale and has been frequently cited as a reason why we need do no more to foster broadband deployment. To put this in a global context, however, this rate of increase is lower than that in 11 other countries – we are in 11th place in penetration and 12th place in growth rate. Others with higher service penetration are not slowing down! If the present trends have continued during the most recent 12 months, we can estimate that we are now *at best* in 15th place in per capita penetration. This is neither reasonable nor timely deployment.

While deployment of DSL or cable may be seen as “reasonable and timely” in terms of the rate of growth or investment, it is almost irrelevant in the context of the world economy.

There needs to be an immediate redirection of the goal to true broadband and an order of magnitude increase in the level of investment in order to achieve that goal. This can only be done by encouraging other sources of investment beyond the traditional carriers.

Although it could be a significant contributor, investment by traditional telephone and cable companies alone *will not be sufficient* to build the network we need for two reasons:

- Investment is tied to income, and revenues are falling. Voice traffic is moving onto alternative paths including wireless and VoIP. It is rapidly becoming a commodity with falling prices. This limits the speed of growth.
- For sound economic reasons, carriers of either type will prefer to install advanced services in areas where the installation cost is relatively low (for example, new suburban development) or in areas where there is a willingness on the part of the customers to pay a premium for the advanced services. This limits coverage.

Carriers are further limited by their ability to assume net debt. Telcos, having paid considerable sums for wireless spectrum, and having over-invested in fiber overbuilds on the most attractive long-haul routes, are understandably reluctant to dig the hole still deeper. And cable operators have expended much of their available capital to upgrade older infrastructures so as to provide data services. So, under the current paradigm it is likely that there will be continuing problems with availability of true broadband in the U.S.

Where else could we get the money? **It makes economic sense for the users of the network to own the infrastructure** – the lines and hardware for delivering the service – and for the telephone and cable companies to facilitate construction and perhaps operate it. Users then would have a competitive choice of multiple offerings, and the nation could entirely sidestep the problem of how to implement competition over provider-owned lines.

There are a number of examples of precisely this model extant in the U.S., and a still larger number in the planning stages. Typically, these are public utility networks or municipal networks owned by the residents of particular regions, or they may be large corporate or university research networks. There are also some statewide regional

networks. Not all of them are open to outside providers, and not all have equally successful business models, but they are “user-owned”, and as such represent new sources of capital investment.

International Comparisons

In February of 2004, deployment of fiber-to-the-home in Japan reached one million customers, or about 13% of broadband subscribers, with 100Mb/s service available at modest cost. In the U.S., about 2% of broadband lines are fiber.

Why is the U.S. so far behind other nations in broadband deployment? In part, the discrepancy stems from such technical factors as differences in population density, but in large measure it seems that the common characteristic of those nations is a strong government push to reach new levels of capability; broadband is seen as an economic imperative in many countries.

In the European Union, the Lisbon Summit of 2000 set the goals at the highest level: that Europe should be the most competitive knowledge-based society in the world by 2010.

Under that heading they listed several requirements, among them:

- This society must be inclusive.
- The benefits of information and communication technologies make it possible to create new and better jobs, and to generate greater prosperity. Specifically,
 - Businesses and citizens must have access to inexpensive world-class communication infrastructure and a wide range of services
 - These benefits should be available for all.

Efforts in Korea to establish a world-class communications infrastructure were greatly stimulated by the IMF financial crisis in the late 1990s. Since then the Korean government has invested heavily in the information technology industry and promoted investment by others. The effort has been astoundingly successful, as shown by the examples we have already cited.

A Stanford University Asia Pacific Research Center Report¹⁰ published in 2002 attributed the success in Korea to both public and private actions:

- Government: Hands-off policies and deregulation leading to a strong infrastructure competition
- Private Sector: Aggressive strategy on the part of providers; Innovation of the PC Bhang (an online gaming café, very popular among all Koreans)

Additionally, they cited such other contributors such as economic timing, housing patterns, and the cultural propensity for Koreans to adopt new technology.

¹⁰ Kyounglim Yun, Heejin Lee, So-Hye Lim, “The Growth of Broadband Internet Connections in South Korea: Contributing Factors”, Stanford University, Asia/Pacific Research Center, September 2002 (<http://APARC.stanford.edu>)

In both cases, the importance of government in setting policy and direction is often cited. And also in both cases, the motivation for doing so has been to provide a stimulus for economic growth. In other words, it is not simply a business for profit proposition.

On the other hand, in a study comparing broadband growth in Asia which compared results in various countries, Izumi Aizu emphasized the importance of grass roots entrepreneurship and “freedom-hungry citizens”, a situation which he contrasted with the “conservative and rigid institutional frameworks of Singapore and Japan” where there has been less public acceptance despite aggressive promotion by the governments.¹¹ If so, the U.S. should be in a good position culturally to move ahead in broadband provided there is sufficient freedom for innovation. But we believe the goal setting and good public policy are equally important, at least.

The high housing density in Korea allowed maximum exploitation of copper assets in the early stages of deployment. Half of the subscribers are within 2km of a central office and 80% are within 3km.¹² This has allowed DSL speeds to go much higher than is possible over most of the U.S. Offerings of 8Mb/s, for example, give the Koreans a much better experience than is possible with a 200kbps line, and thereby actually promote innovation of new applications.

This approach is not really feasible in the U.S. where the service offerings are geared to about 10kft loop lengths. There is also a rather long “tail” to the distribution, which makes it difficult to provide DSL service in large geographic regions of the country – not a very palatable political proposition.

To get to near universal deployment of true broadband in the U.S. a significant fiber plant is needed. Wireless coverage can possibly be a partner in this deployment, covering areas not easily reached with fiber, it can speed up the process. But for that technology, success will degrade service at some point, so it is not the whole solution.

What Actions Can Accelerate Deployment?

Existing carriers complain that using municipal funding mechanisms such as bonds or taxes to build an infrastructure leads to unfair advantage and lack of competition. In the context of existing telecommunications framework, perhaps it does. On the other hand, municipalities and states have long undertaken responsibility for building public utility infrastructures, in cases where it is not profitable for a private company to build, for example, a water and sewer system. The switched voice network is moving quickly into this category. As an asset, its value is rapidly approaching zero, the cost of it notwithstanding.

In the (quite near) future, telecommunications operators will only be able to make money on these assets if they have artificially high prices sustained by monopoly ownership of the lines. Since this outcome is precisely the opposite of the intent of the Telecommunications Act of 1996 – to foster competition and lower prices to the

¹¹ Izumi Aizu, “A Comparative Study of Broadband in Asia: Deployment and Policy”, Asia Network Research, Tokyo, Japan, 2002. (<http://www.anr.com>)

¹² Y-K Lee and D. Lee, “Broadband Access in Korea: Experience and Future Perspective”, IEEE Communications Magazine, Dec. 2003. (Y-K Lee is the President and CEO of KT.)

consumer – it is not likely to be allowed. Shifting the capital investment (and the debt burden) to the users (taxpayers or private enterprises) is one way to overcome this problem. Operators can assume the role of operators, contracted by the users, they can make a reasonable profit this way, and prices will stay under control.

Going along with this change, however, is a need by regulators to ensure that the many new *and converged* networks thus deployed will be able to connect with one another for nationwide service, that they be open to any providers of content who wish to make use of them, that there be a reasonable means to appropriately share costs, and that the networks be secure from outside disruption. This is an entirely different set of priorities for the FCC to consider.

The Inquiry asks a number of questions about facilitating rights of way as a method of accelerating development. The simplest way to do that would be to encourage community networks that could use existing rights of way at no extra cost, perhaps in tandem with ongoing efforts to upgrade their infrastructure for water or sewer services.

Rights of way issues for wireless communications have in fact been facilitated by the government, making it easier for wireless services to locate antenna towers as they wish. This is not a very popular approach for those who end up with the tower in their previously pristine pastoral view. Aerial installations, fiber or copper, are much less expensive than buried cable, but we would not want to advocate intrusive regulations that forced communities away from the trend toward requiring buried service. Communities could be required to make their existing rights of way available to traditional providers, but such regulations, and the likely resistance to them, would be entirely unnecessary if the users owned the network.

Rural deployment is particularly problematical under the current regime. The performance of copper degrades dramatically with distance, limiting the bandwidth available to the end user. Fiber installations are seen as uneconomic, mainly because of the high cost of installation (rights of way and trenching). Community-owned networks can help overcome some of this problem by using existing rights of way to reduce that cost, among other benefits already cited.

The rural problem is not new; the costs of providing ordinary telephone service to rural customers have led to the creation of the Universal Service Fee subsidy. One clear way to help with advanced networks would be to direct that this subsidy in particular be allocated only to reimburse costs for advanced telecommunications, not to subsidize the old network. There are also other grant programs available for rural installations, which could be expanded for this purpose.

With these thoughts as background, we offer the following list of proposed actions:

- **Redefine “broadband”** so as to promote truly advanced services that will justify the investment not only to traditional providers, but also to communities and the nation at large. *That means gigabit-capable networks to the user.* The issue is national economic development, but it will take world-class service to accomplish that and restore our global competitiveness.
- **Reward those who install Gb/s-capable networks with favorable regulatory changes.** The commission has already embarked upon a path of tying regulatory

relief to installation of fiber with some suggestion of success in that the largest companies have announced plans to begin installing new fiber networks. The important thing now is to raise the bar.

- **Focus on fostering fast data services.** Voice and video services are likely to eventually become subsumed as other forms of data or information service, indistinguishable from what we call data service now. Encourage this trend, as it will result in lower costs for the consumer. That means not providing special subsidies or regulatory protection for assets that are likely to become obsolete. To the extent possible, redirect present subsidies. Universal Service Fees, for example, could support Universal *Broadband* Service (under the new definition).
- **Ensure that networks built by communities, utilities, or private entities do not encounter any artificial obstacles** that would hinder such new sources of capital. Ensure that they have easy access to the existing networks without unreasonable costs of connection or artificial technical constraints.
- **Collect information by classes of service**, so as to follow technological trends and to understand the differences in services offered, costs, and economic benefit.